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Farmers' Bulletin 1259
United States Department of Agriculture

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- 5 OCT. 1922
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A SAWFLY INJURIOUS to YOUNG PINES

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YOUNG PINES, both nursery stock and natural reproduction, are often defoliated by larvæ of Leconte's sawfly. Defoliation of young pines is usually severe in its effects, killing, misshaping, or weakening the trees to such an extent that attacks of secondary enemies will kill them.

This insect is common on the scrub pines throughout the eastern United States and is a constant menace to the better species in nurseries or reforesting areas. It can be controlled in nurseries and parks, when the infestation is heavy, by spraying with lead arsenate at the rate of 2 pounds of the powder to 50 gallons of water; or, if scatteringly present, by hand methods such as knocking the larvæ from the trees and crushing them.

In larger and less accessible areas, where it would be impractical to attempt control by spraying, rangers and lumbermen should make a practice of destroying the colonies of these larvæ whenever they are found.

Contribution from the Bureau of Entomology
L. O. HOWARD, Chief

Washington, D. C. January, 1922

A SAWFLY INJURIOUS TO YOUNG PINES.

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The larva, or false-caterpillar, of an insect known as Leconte's sawfly[1] is a serious enemy of pine in nurseries, parks, and reforesting areas in the eastern United States. This insect shows a decided

FIG. 1.—Young silver pine in nursery, completely defoliated by larvæ of Leconte's sawfly.

preference for young trees and has demonstrated its ability to leave its local host and attack other species of pines. The effects of defoliation on young pines (figs. 1, 2), especially before late summer,

[1] *Neodiprion lecontei* Fitch; order Hymenoptera, suborder Chalastogastra, family Tenthredinidae, subfamily Diprioninae.

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are usually severe, the part denuded often being killed. Trees not killed are frequently infested by secondary enemies which com-

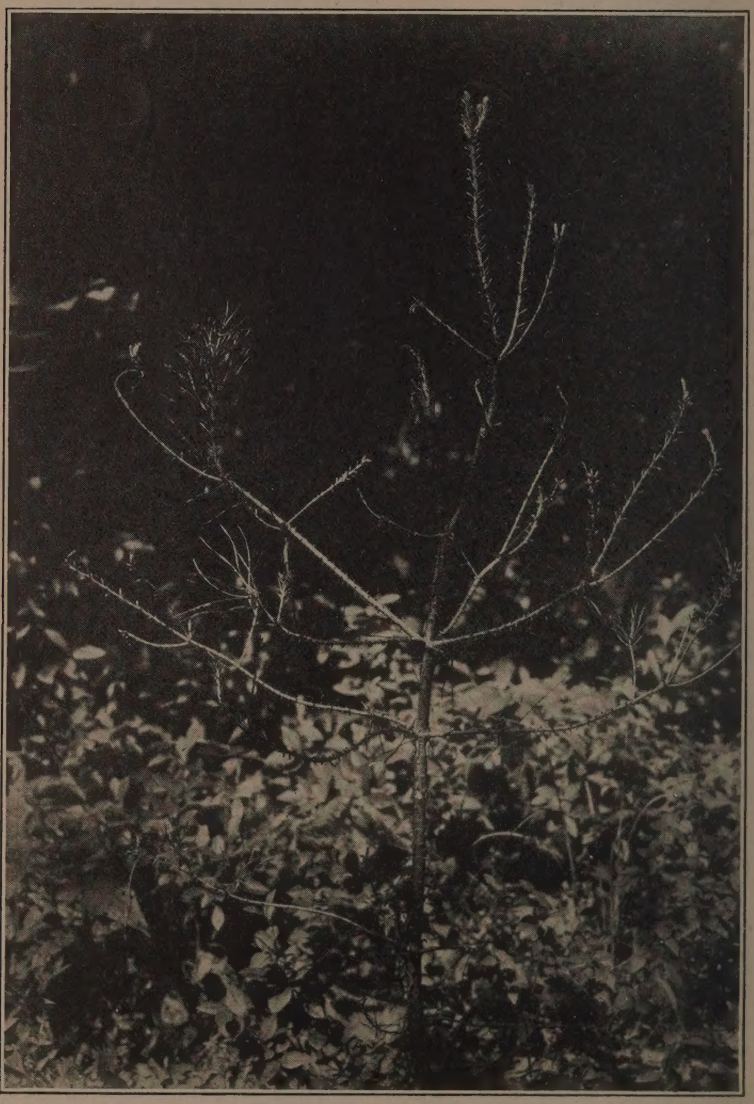

FIG. 2.—Young scrub pine on edge of woods, completely defoliated by larvæ of Leconte's sawfly.

plete the work; and, if by chance the trees recover, they are stunted or misshapen and of little or no commercial or ornamental value.

APPEARANCE, LIFE, AND HABITS OF THE INSECT.

The needles are eaten by small larvæ one-eighth of an inch long when young to three-fourths or seven-eighths of an inch in length when full grown, which feed in colonies or groups. The young larvæ (fig. 3) are pale, whitish to leaden white, and unspotted, with the head brownish; but they change in appearance through a series of molts (five for the male and six for the female), becoming yellowish-white with a number of rows of black spots on the body (fig. 4) and with the head dark brown to orange. These larvæ have three pairs of legs on the thorax and eight pairs of smaller legs on the abdomen, and the head has only a single pair of eyes, situated one at each side in a rather large, circular, blackish spot.

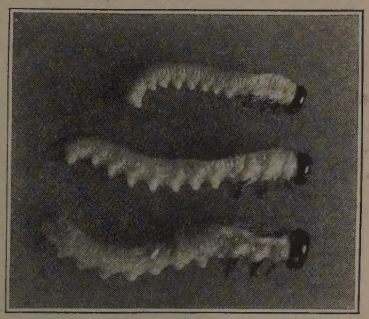

FIG. 3.—Young larvæ of Leconte's sawfly, second and third stages. Four times natural size.

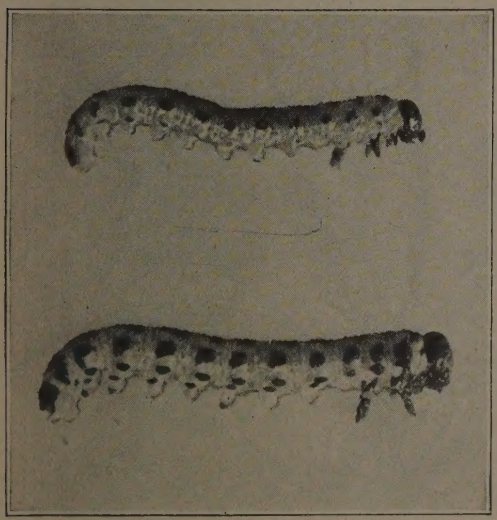

FIG. 4.—Larvæ of Leconte's sawfly, fourth and fifth stages. Four times natural size.

The larvæ are found clustered in colonies feeding on the pine needles and occasionally on the tender bark (fig. 5) of the young twigs.

When full grown the larvæ spin cocoons from which they emerge later as adults. Adult emergence is divided into two periods, a first issuance, brood A, and a second issuance, brood B. When the eggs are laid and hatch in the late spring or early summer, adults of brood A issue from the cocoons in the late summer and early fall of the same year; but adults of brood B from this batch of eggs do not issue from their cocoons until the late summer and early fall of

the following year, a complete colony developmental period of 14 months. If the eggs are laid and hatch in the late summer, adults of brood A of these eggs issue from their cocoons in the spring and early

FIG. 5.—Terminal of young scrub pine showing defoliation and feeding work of larvæ of Leconte's sawfly on bark. Three-fourths natural size.

summer of the following year, and adults of brood B of the same batch of eggs emerge from their cocoons in the late summer and early fall of the same year as brood A, making a complete colony developmental period of 12 months. (See diagram, fig. 6.)

The cocoons (fig. 7) have been found several inches underground and only in this location; but it is quite possible that some larvæ, es-

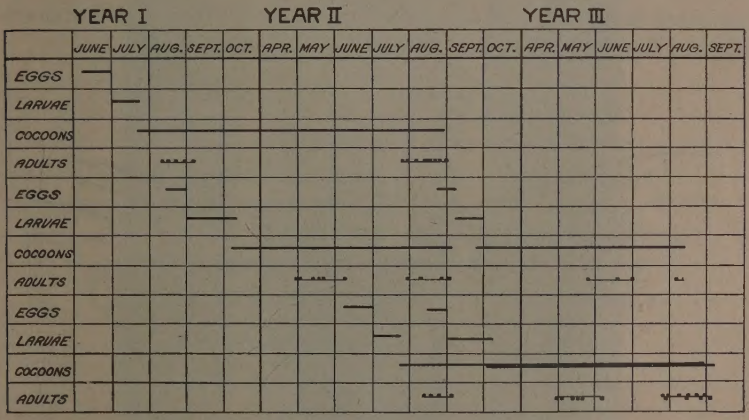

FIG. 6.—Chart showing life and seasonal history of Leconte's sawfly through the active period of three years (November to March omitted, the insect being in the cocoon during this period).

pecially those the adults of which will issue before winter, may spin their cocoons in more exposed places, even on the pine twigs. The

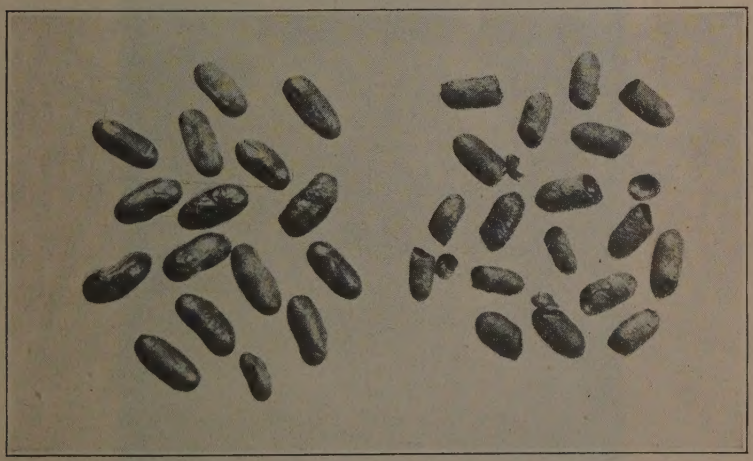

FIG. 7.—Cocoons of Leconte's sawfly: At left, unopened ones containing the insects; at right, those from which adults have issued (emergence holes shown). The females issue from the larger cocoons and the males from the smaller ones. Approximately natural size.

cocoons are tough, papery, red-brown, capsule-shaped cases, five-sixteenths to seven-sixteenths of an inch long.

The adults (fig. 8) are rather robust, four-winged insects. The male is black with reddish yellow legs and has beautiful feathery feelers, or antennæ. The female has the head and first two thoracic segments reddish brown and the third thoracic segment and abdomen black. Her feelers are rather slender and not feathery.

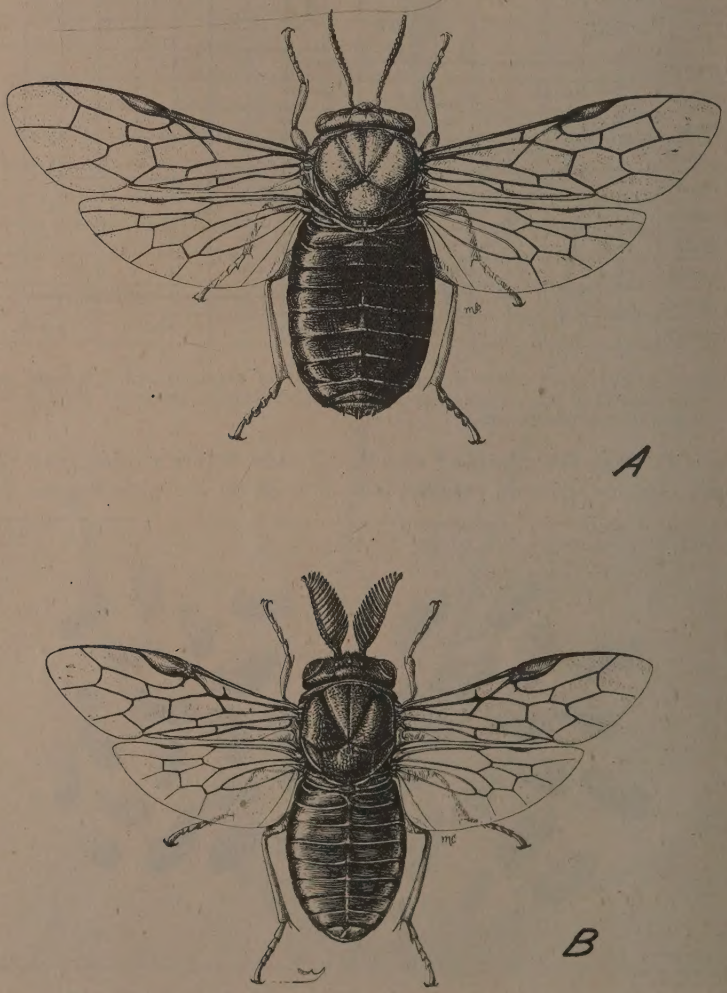

FIG. 8.—Leconte's sawfly: *A*, Adult female; *B*, adult male. About eight times natural size.

The sawflies get their name from the complicated egg-laying organ of the female. It is well named "the saw," having blades and teeth and being used exactly as a saw when tearing into the leaves in cutting a pocket for the eggs.

The eggs are laid in shoe-shaped pockets, or slits, in the needles. Usually, attacked needles occur in a cluster, each needle bearing a

FIG. 9.—Needles of scrub pine showing eggs of Leconte's sawfly embedded in them. Much enlarged.

number of eggs. The egg scars, or pockets, are rather easily seen, being yellowish on the dark green needles. (Fig. 9.)

DISTRIBUTION.

Leconte's sawfly occurs throughout the eastern United States, the accompanying map (fig. 10) indicating localities from which the species has been recorded or specimens received.

TREES ATTACKED.

This species seems to have a preference for jack pine,[2] red pine,[3] and scrub pine,[4] each of which furnishes a local host in some part of the eastern United States throughout which the insect occurs. Its attack is not limited to these species, however, for it is also found on or recorded from white pine,[5] scotch pine,[6] loblolly pine,[7] shore pine,[8] silver pine,[9] mugho pine,[10] western yellow pine,[11] longleaf pine,[12] Austrian pine,[13] and American larch.[14]

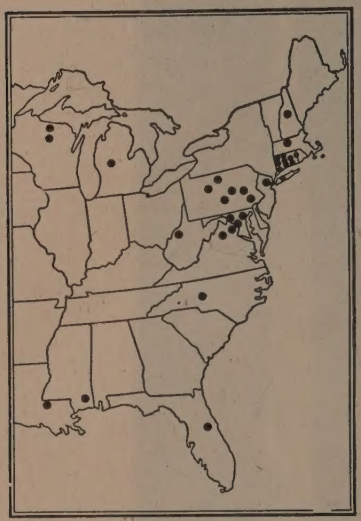

FIG. 10.—Map showing localities where Leconte's sawfly is known to occur.

PERIODICAL OUTBREAKS.

Leconte's pine sawfly, like most insect enemies of forest trees, appears and disappears periodically. For several years this species will be very abundant, then for a few years it will be rare. The cause for this periodic disappearance has not been determined, but the low records of parasitism indicate that some factor other than parasitism plays an important rôle.

NATURAL ENEMIES.

Eight species of insect parasites and an infectious disease have been found killing this sawfly. None of these enemies, however, has been found widely enough distributed or abundant enough to account for the periodic disappearance of the species, and it is certain that neither any nor all of these natural checks are sufficiently numerous or effective to justify disregard of the artificial control measures suggested.

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[2] *Pinus banksiana.*
[3] *P. resinosa.*
[4] *P. virginiana.*
[5] *P. strobus.*
[6] *P. sylvestris.*
[7] *P. taeda.*
[8] *P. contorta.*
[9] *P. monticola.*
[10] *P. mughus.*
[11] *P. ponderosa.*
[12] *P. palustris.*
[13] *P. austriaca.*
[14] *Larix americana.*

CONTROL.

The control of Leconte's sawfly depends largely upon the extent and location of the infestation. In nurseries and parks, when the infestation is heavy, a thorough spraying with lead arsenate, 2 pounds of powdered lead arsenate to 50 gallons of water (or 6 teaspoonfuls to the gallon), will give good results. Spraying should begin when the larvæ are first discovered. In a scattered infestation, hand picking or knocking the larvæ from the trees and crushing them will be found more economical and at least as effective.

In large areas of either natural or artificial reproduction control can not be generally practiced because of its expense; but rangers and lumbermen should make it a habit to destroy the colonies of these larvæ whenever found.

Whenever these insects are observed in any locality and control measures are practiced against them, it is important that the territory be carefully surveyed for the following 14 months, since it is possible that some larvæ may have escaped the treatment and have spun cocoons. This possibility makes watchfulness necessary over the entire colony period of the species in order that an emergence of adults from these cocoons may not reestablish the infestation.

WASHINGTON : GOVERNMENT PRINTING OFFICE : 1922